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Centenary, May 5, 1939  
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## EMILE JAVAL—FRENCH SAVANT

CENTENARY, MAY 5, 1939

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JAVAL, whose ideal was Benjamin Franklin, was himself of the Franklin type, and emulated his hero in consistent industry and manifold interests. For Javal was not only an oculist, but a legislator, journalist, educational leader, hygienist and social reformer as well.

Javal's grandfather, Jacques, was a poor self-educated Alsatian, who peddled for a livelihood from the age of ten, but finally achieved enough means to found a small but successful bank. When this ancestor was born in 1780, four fifths of the 50,000 Jews of France were living in Alsace-Lorraine, having a communal government of their own, but very limited civil rights. Political emancipation first came with the French Revolution and its Declaration of the Rights of Man. In 1806, at the suggestion of Napoleon, the Jews of France changed their oriental patronymics to the type of surname used by the rest of French citizenry. Javal's grandfather inscribed his name Jacob on the register, which, miscopied by the clerk as Javal, became the family name thereafter.

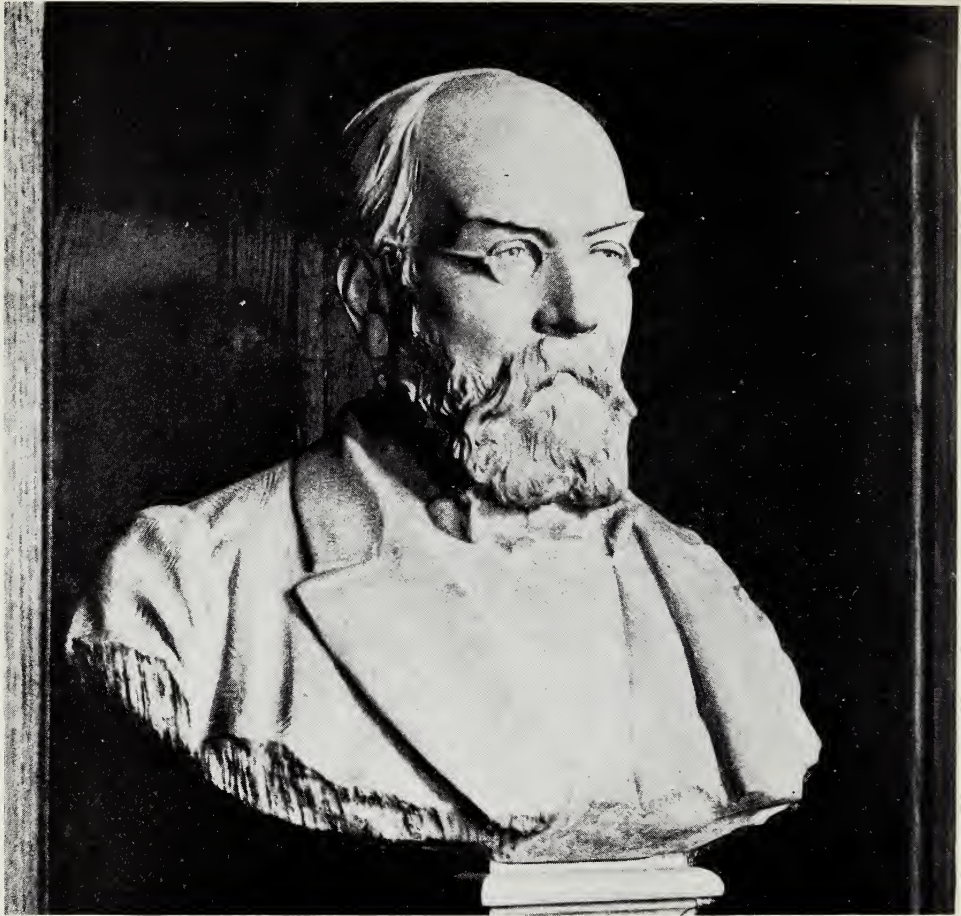
Leopold, Javal's father, finished a careful education by a year in England, where he assimilated English mercantile methods and a love of liberalism. On his return, he joined an expeditionary force to Algiers, where his heroism was awarded the Legion of Honor. Back in mufti, his flair for vast enterprise extended beyond banking to politics, industry, commerce, mines, railroads and agriculture. An associate of the celebrated financier, Jacques Laffitte, and for fifteen years deputy, he maintained a leading position in the world of affairs.

In 1838 Leopold married Augusta de Loemel, the cultivated daughter of a leading banker in Prague. The love for Rousseau that Byron had awakened in the intellectual world was ardently shared by her and her family. Imbued with the idea of progressive education expounded in Rousseau's "Emile," her first child was named after the book and reared by its tenets.

Emile Javal derived from his father the spirit of enterprise, from his mother a devotion to service, from both a keen intellect. Not for him the gay life of a rich man's son; his way was rather that of the practical idealist, zealous in work and simple in tastes. Javal inclined to a scientific career and could not be persuaded to follow his father's footsteps. He originally preferred medicine, but, bowing to family opposition, compromised on mining, and after graduation accepted an engagement in the coal mines controlled by his family. His concern about his sister's squint and his discovery of his own astigmatism reawakened his interest in medicine. His first researches in optics received such encouragement that he abandoned mining and embarked on a medical career, in which he finally established himself as one of the world's foremost authorities on visual hygiene.

After the Franco-Prussian war, in which Javal served as medical officer, he became absorbed in civic issues, education and social reform. He followed his father's lead in politics, and for five years was deputy from his department. He opposed the French construction of the Panama Canal and prophesied disaster for the project. Fearful of depopu-





EMILE JAVAL

lation, he sponsored a law relieving families of seven from all direct taxes. Though the Javal law remained in force but a year, exemption privileges of similar pattern have lately been reconsidered. The influence of his studies on the factors affecting population is reflected also in the novels of Zola. An ardent advocate of adult education, he was with Camille Flammarion among the charter members of an association for the popular diffusion of scientific knowledge, and for many years its president.

Of independent means, Javal's office provided material for private study rather than a source of income. If a

patient proved interesting, he would waive the fee and invite him to dinner. Once a month he visited the villages in his canton and gratuitously gave his services to the indigent—a tradition which his Danish assistant, Tscherning, generously continued. A vexatious lawsuit followed a report in which he deflated the advertised claims of some new lenses. An enlightened court fortunately decided for scientific freedom. His young sister, who is still living in Paris, has the distinction of being the first in the world to receive eye exercises in the treatment of squint. Javal's methods achieved a perfect cure, which has persisted to this day. Javal

discovered the eye movements in reading, which laid the basis of an objective analysis of reading ability that has since culminated in instruments for recording eye movements and for training deficient readers.

Javal proposed an original method for teaching reading and writing simultaneously. He emphasized hygienic school construction, proper posture and efficient writing habits. With many educators of that period, he favored vertical penmanship, a beautiful example of which is the hand of Thomas A. Edison. His studies of the effect of variations of light, paper and print on the ease and speed of reading foreshadowed the modern interest in the subject. Ever motivated by humanitarian ideals, he stressed that to facilitate reading and writing is to accelerate communication among men.

In 1897, the excitement of the Dreyfus trial, in which he was keenly interested, precipitated an attack of glaucoma that left him blind for some hours. Now keenly aware of his prospective doom, he prepared his notes for easy accessibility so that whatever happened he could carry on his appointed tasks. Three years later, stark blind, Javal resolved to imitate these brave souls like Euler, Huber, Milton and Fawcett, who had not been

deterred by a like fate from magnificent achievement. He invented a writing rack to carry on his correspondence. To Javal, dependence was the chief misery of blindness, and, in a widely circulated book that he wrote at this time, he strove to help the blind to help themselves. He encouraged physical as well as intellectual activity, and himself, by means of a tandem bicycle, continued regularly his favorite exercise.

To his friend, Zamenhof, the oculist of Warsaw, who invented Esperanto, he made various acceptable suggestions to render the language even simpler. He pleaded for the general adoption of this auxiliary language, which would be advantageous to the blind, since it would permit an international use of Braille publications.

Death came on January 20, 1907. Throughout the civilized world scholarly journals and organizations paid homage to the passing of a personage. At the instance of his widow his famous library was transported to suitable quarters in the chief eye clinic of Paris, and a splendid bust by Verlet was presented to grace the reading room. On February 18, 1914, La Bibliotheque Javal was dedicated, a fitting memorial to one of the great scholars in medicine.

## "WHENCE COMETH LIFE?"

By Professor WILLIS R. HUNT

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PHILOSOPHERS have for ages attempted to explain life and death and to determine where one leaves off and the other begins. Present-day scientists are continuing to investigate this burning question.

Maybe the turning point is where the protein-building catalyst or enzyme first appears. Although it is non-living itself, it no doubt is the precursor of life, that is, it precedes and gives intimation of the coming of life. Possibly the most primitive living unit may be the gene. Have any of you ever seen a gene? No! It can not be seen even by the ultra microscope, but if we are to account for the hereditary behavior of protoplasm we must postulate invisible genes. Genes, as you remember, are the units or atoms of heredity. Other assumptions are that the viruses or bacteriophages may be the most elementary predator or form of life.

It will not be possible to say just where or how life first appears, but some evidence can now be given that the genes and the viruses are at the boundary or border line of life.

Like life the origin of disease has been subject to many theories and much speculation down through the ages. Primitive peoples believed that evil spirits caused disease. In the Middle Ages invisible particles were thought to be the cause. Bacteria were not even seen until the middle of the seventeenth century, and were only proven to be the cause of disease about sixty years ago.

It has been estimated that there are seven hundred and forty-two living agents causing disease in man. Thirty-one are ascribed to a still unseen something, called a virus. There are some

forty more viruses causing disease in the lower animals, fowls, insects, fishes and plants. Examples of some virus diseases, to mention a few, are smallpox, rabies, parrot fever, yellow fever, herpes, mumps, measles, infantile paralysis, warts, epidemic influenza and the common cold. Distemper of dogs, fowlpox, carppox, swinepox, jaundice of silkworms and the so-called mosaic diseases of the tobacco, potato and tomato plants are examples of virus diseases in other groups of organisms.

Just what the nature and properties of these "mysterious purveyors of disease" are has been one of medicine's and bacteriology's greatest problems. Up to recently the following three questions had not been answered: (1) Are viruses animate or inanimate? (2) Are they ultramicroscopic entities related to bacteria? (3) Do they represent inanimate chemical principles like catalysts or enzymes, for example, pepsin, an organic enzyme, which stimulates digestive changes in the stomach?

We may define a virus as an infective agent below the size limit of microscopic determination which passes through the finest made filters. They are obligate parasites; no saprophytic forms are known. This is not surprising, is it, since symptoms are the only means of recognizing them? They can not grow and multiply in artificial culture media, but in tissue culture, specific for the virus, the infective active agent has been developed. For immunization viruses are propagated by serial injection of animals. Their behavior is very much like that of a living organism.

An open mind is necessary in regard





